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EXAMINER	
PHAM, THANHHA S	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/756,195	KHOURI ET AL.	
	Examiner	Art Unit	
	Thanhha Pham	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *9-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,16-20 and 23-30* is/are rejected.

7)☒ Claim(s) *7,8,21 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 08/17/2005.

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-8 and 16-30, drawn to a device, classified in class 257, subclass 4.

II. Claims 9-15, drawn to a method, classified in class 438, subclass 95+.

The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product invention I can be made by another and materially different process, for example, forming a contact structure including a first conducting region and a second conducting region being of chalcognic material wherein said first conducting region being electrical contact with the second conducting region then selectively forming a dielectric layer extending on top of the semiconductor body to the provide the contact structure in said dielectric layer. Moreover, the product invention I can be made another and material different process without forming a strip

shape region for the first conducting region (see independent claims 1, 9, 16 and 25 for details).

2. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

3. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

5. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 9-15 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Priority

6. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Specification should be correct to support limitations of original claims 6 and 16 including PMC memory cell that includes a PMC storage element formed in dielectric layer and a selection element, said PMC storage element being formed by a heater element (first conducting region) and a storage region (second conducting region), the storage region being of chalcogenic material and being contact with the heater element wherein the heater element has an end face extending transversely to the lower surface and forming a contact area with the storage region.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-3, 6 and 16-18, 23-26, 28-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen [US 6,759,267]

► With respect to claims 1 and 25, Chen (fig 2C, cols 1-6) discloses the claimed electronic semiconductor device comprising:

a body of semiconductor material (12, col 3 lines 44-58) having an upper surface;

a dielectric layer (16/50/54, cols 3-4) extending on top of said body; and

a contact structure in said dielectric layer, said contact structure comprising a first conducting region (44) and a second conducting region (46), said second conducting region being of chalcogenic material and being in electric contact with said first conducting region (cols 3-4);

wherein said first conducting region (44) has longitudinal direction delimited by an end face extending transversely to said upper surface, said end face (vertical planes of first conducting region 44) forming a contact area with said second conducting region

► With respect to claims 2 and 26, Chen (fig 2C) shows said first conducting region(44) extends lengthwise in a direction parallel to said upper surface.

► With respect to claim 3, Chen (fig. 2C) shows said end face is perpendicular to said upper surface. ***__Notice__: *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not neccessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote 3). See also In re Brown, 173 USPQ 685 (CCPA 1972); In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; and In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).*

► With respect to claims 6 and 28, the contact structure of Chen would be part of a PCM storage element of a PCM memory cell that further includes a selection element (12/40/30), said PCM storage element being formed by a heater element including said first conducting region (44: contact 44 conducting electricity would create heat in memory device, as a heater, to the storage region of memory material 46 to cause the PMC device to operate) and a storage region comprising said second conducting region (46). It is noted that, the intended use in this device claim does not result in a structure difference between the claim invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior structure is capable of performing the intended use, then it meets the claim. Ex parte Masham, 2 USPQ2d 1647 (1987).

► With respect to claim 16, Chen (fig 2C) discloses the claimed electronic PCM device comprising:

a body of semiconductor material (12) having a lower surface;

a dielectric layer (16/50/54) extending on top of said body; and

a PMC memory cell that includes a PCM storage element (46/44) formed in the dielectric layer and a selection element (12/48/30), the PCM storage element being formed by a heater element (44: contact 44 conducting electricity would create heat in memory device, as a heater, to the storage region of memory material 46 to cause the PMC device to operate), wherein the heater element has an end face extending transversely to the lower surface and forming a contact area with the storage region (46, chalcogenic material for memory).

► With respect to claim 17, Chen (fig 2C) shows the heater element (44) extends in a direction parallel to the lower surface.

► With respect to claim 18, Chen (fig 2C) shows said end face is perpendicular to said upper surface. ***Notice: *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not neccessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote 3). See also In re Brown, 173 USPQ 685 (CCPA 1972); In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; and In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).*

► With respect to claims 23-24, Chen (fig 2C) discloses the dielectric layer (16/50/54) includes a plurality of dielectric layers formed on top of one another.

► With respect to claim 29, Chen (fig 2C) discloses the selection element (12/48/32) is formed in the semiconductor body, a lower electrode (40) extends in the dielectric layer between the selection element (12/48/30) and the first conducting region (44).

► With respect to claim 30, Chen (fig 2C) discloses a conducting contact (52) extending upwardly from the upper surface of the semiconductor body, the conductive contact (52) electrically couple with the first conducting region (the conductive contact 52 electrically couples with the first conducting region 44 through the memory material 46)

9. Claims 1-3, 6, 16-18, 23-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Lowrey et al [US 2004/0245603].

► With respect to claims 1 and 25, Lowrey et al (figs 1- 2, text [0001]-[0128]) discloses the claimed electronic semiconductor device comprising:

a body of semiconductor material (102) having an upper surface;

a dielectric layer (128/140/180) extending on top of said body; and

a contact structure in said dielectric layer, said contact structure comprising a first conducting region (contact layer 270) and a second conducting region (memory material 250), said second conducting region being of chalcogenic material and being in electric contact with said first conducting region;

wherein said first conducting region (270) has a longitudinal direction delimited by an end face extending transversely to said upper surface, said end face (vertical planes of first conducting region 270 contacting second conducting region 250) forming a contact area with said second conducting region.

► With respect to claims 2 and 26, Lowrey et al (figs 1-2) shows said first conducting region (270) extends in a direction parallel to said upper surface.

► With respect to claim 3, Lowevery et al (figs 1-2) shows said end face is perpendicular to said upper surface. ***__Notice__: *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not neccessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote 3). See also In re Brown, 173 USPQ 685 (CCPA 1972); In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; and In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product -by[-] process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).*

► With respect to claims 6 and 28, the contact structure of Lowrey et al would be part of a PCM storage element of a PCM memory cell that further includes a selection element (102/110/112/113), said PCM storage element being formed by a heater element including said first conducting region (270: in operation, contact 270 conducting electricity would create heat in memory device, as a heater, to the storage region of memory material 250) and a storage region comprising said second conducting region (250). It is noted that, the intended use in this device claim does not result in a structure difference between the claim invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior structure is capable of performing the intended use, then it meets the claim. Ex parte Masham, 2 USPQ2d 1647 (1987).

► With respect to claim 16, Lowrey et al. (figs 1-2, text [0001]-[0128]) discloses the claimed electronic PCM device comprising:

a body of semiconductor material (102) having a lower surface;

a dielectric layer (128/140/180) extending on top of said body; and

a PMC memory cell that includes a PCM storage element formed in the dielectric layer and a selection element (102/110/112/113), the PCM storage element being formed by a heater element (270 : in operation, contact 270 conducting electricity would create heat in memory device, as a heater, to the storage region of memory material 250), wherein the heater element has an end face (vertical plane contacting the vertical region of memory material 250) extending transversely to the lower surface and forming a contact area with the storage region (250).

► With respect to claim 17, Lowrey et al. (figs 1-2) shows the heater element (270) extends in a direction parallel to the lower surface.

► With respect to claim 18, Lowrey et al. (figs 1-2) shows said end face is perpendicular to said lower surface. ***__Notice__: *It is noted that process limitation of "within process tolerances" does not carry weight in a claim drawn to structure because distinct structure is not neccessarily produced. See In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). In addition, a "product by process" limitation is directed to the product per se, no matter how actually made, in re Hirao, 190 USPQ 15 and 17 (footnote 3). See also In re Brown, 173 USPQ 685 (CCPA 1972); In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; and In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); all of which made clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product by a new method is not patentable as a product, whether claimed in "product by process" claims or not. "Even though product -by[-] process*

claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

► With respect to claims 23-24, Lowrey et al (figs 1-2) discloses the dielectric layer (128/140/180) includes a plurality of dielectric layers formed on top of one another (layer 180 on top of layer 128 and 140).

► With respect to claim 29, Lowrey et al (figs 1-2) discloses the selection element (102/110/112/113) is formed in the semiconductor body, a lower electrode (130a, 130b) extends in the dielectric layer between the selection element and the first conducting region (270).

► With respect to claim 30, Lowery et al (figs 1-2) discloses a conducting contact (130a/130b) extending upwardly from the upper surface of the semiconductor body, the conductive contact (130a/130b) electrically couple with the first conducting region (the conductive contact 130a/130b electrically couples with the first conducting region 270 through the memory material 250)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen [US 6,759,267] or Lowrey et al [US 2004/0245603].

With respect to claim 5 and 20, the claimed range dimension of end face is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in In re Aller 105 USPQ233, 255 (CCPA 1955)., the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

11. Claims 4-5, 19-20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen [US 6,759,267] or Lowrey et al [US 2004/0245603] in view of Lowrey et al. [WO 0209206].

► With respect to claims 4, 19 and 27, Chen and Lowrey et al ('603) substantially discloses the claimed device including the end face transversely to the lower/upper surface and forming a contact area with the storage region. Chen and Lowrey et al ('603) are silent about the shape of the end face of a generally rectangular shape having a height and a width.

However, the claimed shape is obvious for those skilled in the art since the court held that the configuration of the claimed container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant. *See In re Dailey, 357 F. 2d 669, 149 USPQ 47 (CCPA 1966).*

Moreover, Lowrey et al. ('206) (fig 9D) shows an end face of the generally rectangurlar shape having the height and the width for a contact area to the first conducting region of chalcogenic material of the storage region.

Therefore, at the time of invention, it would have been obvious for those skilled in the art, in view of Lowrey et al (206'), to select the claimed shaped of the end face of rectangular shape for the device of Chen or Lowrey et al ('603) to provide the contact area to the first conducting region of chalcogenic material of the storage region for operating the memory device.

► With respect to claims 5, 20 and 27, the claimed range dimension of end face is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. *See In re Aller 105 USPQ233, 255 (CCPA 1955); In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Allowable Subject Matter

12. Claims 7-8 and 21-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following are statements of reasons for the indication of allowable subject matter:

► Recorded Prior Art fails to disclose or suggest the combination structure of an electronic semiconductor device as recited in the base claim 6 including wherein said selection element is formed in said body, a lower electrode extends in said dielectric layer between said selection element and said first conducting region and an upper electrode extends in said dielectric layer on said second conducting region and forms a bit line as characteristics in claim 7.

► Recorded Prior Art fails to disclose or suggest the combination of the electronic PCM device as recited in the base claim 16 including wherein the selection element is

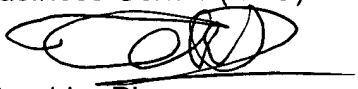
formed in the body, a lower electrode extends in the dielectric layer between the selection element and the heater element and an upper electrode extends in the dielectric layer on the storage region and forms a bit line as characteristics in claim 21.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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